AMENDMENT UNDER 37 C.F.R. 1.116 – EXPEDITED PROCEDURE

Serial Number: 09/964,586 Filing Date: September 28, 2001

Title: PACKAGE STIFFENER (As Amended)

Assignee: Intel Corporation

IN THE CLAIMS

Please amend the claims as follows.

- 1. (Cancelled)
- 2. (Currently Amended) An IC package as claimed in claim <u>78</u> [[1]], wherein the package stiffener includes a copper ring split into power and ground portions, and insulating couplers electrically isolating the power and ground portions of the split copper ring.
- 3. (Previously Presented) An IC package as claimed in claim 2, wherein the split copper ring mounts on the substrate via a solder with a low resistance path to deliver large amounts of current to the substrate and remove heat from the substrate.
- 4. (Currently Amended) An IC package as claimed in claim <u>77</u> [[1]], wherein the substrate comprises one of a ceramic, a flex, and an integrated circuit printed circuit board (IC-PCB) carrier package.
- 5. (Previously Presented) An IC package as claimed in claim 4, further comprising one of a pinned grid array (PGA), and a ball grid array (BGA) carrier package.
- 6. (Previously Presented) An IC package as claimed in claim 4, further comprising one of a flip chip pin grid array (FC-PGA), and a flip chip ball grid array (FC-BGA) carrier package.
- 7. (Currently Amended) An IC package as claimed in claim <u>78</u> [[1]], wherein the package stiffener includes one of electrically conductive, insulating, and intermingled electrically conductive and insulating sections, and one of a molded, stamped, etched, extruded and deposited frame, wherein the stiffener is to withstand temperatures of at least normal IC operation.

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8. (Previously Presented) An IC package as claimed in claim 2, further comprising a heat spreader plate bonded to the split copper ring by epoxy and to the die by thermal interface material.

9. (Currently Amended) An IC package as claimed in claim <u>78</u> [[1]], wherein the package stiffener is to support at least partially a heat sink.

Claims 10-64. (Canceled)

- 65. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame extends along at least two side edges of the substrate.
- 66. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame is positioned at two separate sections on the substrate.
- 67. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame is positioned at separate corner edges of the substrate.
- 68. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame includes a ring that extends along the perimeter of the substrate.
- 69. (Previously Presented) An integrated circuit (IC) package as claimed in claim 68 wherein the frame has rounded corners.
- 70. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame and the substrate have similar coefficients of thermal expansion.
- 71. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] wherein the frame has a ground side portion and a power side portion.

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- 72. (Previously Presented) An integrated circuit (IC) package as claimed in claim 71 wherein the ground side portion and the power side portion are separated by insulating couplers.
- 73. (Previously Presented) An integrated circuit (IC) package as claimed in claim 72 wherein the insulating couplers aid in the structural integrity of the frame.
- 74. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>84</u> [[63]] further comprising a spreader plate that couples the frame and the die, wherein the frame and the die are between the spreader plate and the substrate.
- 75. (Previously Presented) An integrated circuit (IC) package as claimed in claim 74 wherein the spreader plate and the frame are integral.
 - 76. (Previously Presented) An integrated circuit (IC) package comprising: a substrate having a die-side, wherein a die is disposed upon the die-side of the substrate; a power pod supplying power to the die; and
- a package stiffener disposed upon the die-side of the substrate, and spaced from the die to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate, wherein the package stiffener electrically couples the power pod and the substrate and includes a capacitor.
 - 77. (Currently Amended) An integrated circuit (IC) package <u>comprising</u>: a <u>substrate supporting at least a die</u>; and

a package stiffener mounted at a perimeter of the substrate, and arranged apart from the die on the substrate to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate, as claimed in claim 1 wherein the package stiffener includes a plurality of cooling fins.

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78. (Currently Amended) An integrated circuit (IC) package <u>comprising:</u> a <u>substrate supporting at least a die; and</u>

a package stiffener mounted at a perimeter of the substrate, and arranged apart from the die on the substrate to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate, as claimed in claim 1 wherein the package stiffener includes a capacitor.

- 79. (Previously Presented) An integrated circuit (IC) package as claimed in claim 78 wherein the capacitor includes an insulator.
- 80. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>77</u> [[1]] wherein the package stiffener includes at least one of a plurality of power ground sections and a plurality of insulating couplers.
- 81. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>77</u> [[1]] wherein the package stiffener includes a ground path from the die to the substrate.
- 82. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>77</u> [[1]] wherein the package stiffener includes a rectangular frame.
- 83. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>77</u> [[1]] wherein the package stiffener includes a rounded frame.
- 84. (Currently Amended) An integrated circuit (IC) package as claimed in claim 63 comprising:

a substrate having a die-side, wherein a die is disposed upon the die-side of the substrate; and

a frame disposed upon the die-side of the substrate, and spaced from the die to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate, wherein the frame includes a capacitor.

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- 85. (Previously Presented) An integrated circuit (IC) package as claimed in claim 84 wherein the capacitor includes an insulator.
- 86. (Currently Amended) An integrated circuit (IC) package as claimed in claim 63 comprising:

a substrate having a die-side, wherein a die is disposed upon the die-side of the substrate; and

a frame disposed upon the die-side of the substrate, and spaced from the die to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate, wherein the frame includes a plurality of cooling fins.

- 87. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>86</u> [[63]] wherein the frame includes at least one of a plurality of power ground sections and a plurality of insulating couplers.
- 88. (Currently Amended) An integrated circuit (IC) package as claimed in claim <u>86</u> [[63]] wherein the frame includes a ground path from the die to the substrate.
- 89. (Previously Presented) An integrated circuit (IC) package as claimed in claim 76 further comprising a plurality of power pods supplying power to the die.
 - 90. (Canceled)
- 91. (Previously Presented) An integrated circuit (IC) package as claimed in claim 76 wherein the capacitor includes an insulator.